

STATE OF ILLINOIS  
ILLINOIS COMMERCE COMMISSION

Illinois Bell Telephone Company	)	
	)	
Proposed Implementation of High	)	Docket No. 00-0393
Frequency Portion of Loop (HFPL)/Line	)	
Sharing Service	)	

SUPPLEMENTAL Reply Testimony of Danny Watson  
On Behalf of Rhythms Link, Inc.

PUBLIC VERSION

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Counsel for Rhythms Links, Inc.

Dated July 13, 2001

OFFICIAL FILE

ILL. C. C. DOCKET NO. 00-0393

Rhythms  
Beh Exhibit No. 2.1

1 Witness \_\_\_\_\_

Date 7-25-01 Reporter CB

**SUPPLEMENTAL REPLY TESTIMONY OF DANNY WATSON  
ON BEHALF OF RHYTHMS LINKS, INC.  
DOCKET 00-0393**

**I. INTRODUCTION**

**1. Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.**

A. My name is Danny Watson. I am currently Collocation Manager with Rhythms Links, Inc. ("Rhythms"). My business address is 999 Liquid Amber Lane, Sonoma, California 95476.

**2. Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN THIS PROCEEDING?**

A. Yes. On July 2, 2001 I filed Reply Testimony in support of Rhythms Links, Inc.

**3. Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

A. I will address a number of technical issues related to line sharing over SBC-Ameritech's Project Pronto architecture based on documents that were not available to Rhythms at the time of my Reply Testimony. In particular, I have had the opportunity to review relevant materials supplied by SBC in the Kansas line sharing case, as well as materials obtained directly from Alcatel, which provide engineering level detail about the features, functions, and capabilities of the Litespan 2000 and 2012 NGDLC platforms, as well as information about Alcatel's future plans for these platforms.

1 4. Q. HAS ANY OF THIS ADDITIONAL INFORMATION CAUSED YOU TO  
2 DETERMINE THAT ANY PORTION OF YOUR PRIOR TESTIMONY  
3 WAS INCORRECT?

4 A. No. In fact, my review of the detailed documents referenced above reinforces the  
5 conclusions contained in my Reply Testimony. I will describe the additional  
6 information that I learned since filing my Reply Testimony.

7 **II. ALCATEL'S LITESPAN NGDLC IS A ROBUST HIGH CAPACITY**  
8 **BROADBAND PLATFORM THAT CAN SUPPORT CURRENT AND FUTURE**  
9 **FEATURES, FUNCTIONS AND CAPACITY NEEDS**

10 5. Q. PLEASE DESCRIBE THE ALCATEL DOCUMENTS THAT YOU  
11 REVIEWED.

12 A. Alcatel supplied approximately five feet of documents to Rhythms. Most of these  
13 documents are various versions of Alcatel's confidential technical and  
14 engineering publications, including a print out of the Litespan 2000/2012  
15 Standard Practices Manual, which itself is over 5,000 pages.<sup>1</sup> These documents  
16 are the ones used by SBC-Ameritech engineers to install and configure the  
17 Litespan platform. As such, these documents contain all of the detailed  
18 information concerning current and planned features, functions and capabilities of  
19 the Litespan platform.

20 6. Q. DO THESE DETAILED ALCATEL DOCUMENTS SUPPORT  
21 AMERITECH'S ASSERTIONS IN THIS CASE REGARDING THE  
22 CAPABILITIES OF THE LITESPAN PLATFORM?

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<sup>1</sup> The version of this Litespan manual initially supplied by Alcatel is an outdated 1997 version that does not address any of the ADSL, ATM or line sharing issues covered by later versions of that publication. I received the most current version of this manual on a CD ROM only yesterday, and therefore my review was necessarily limited. I will continue to review these materials and reserve the right to supplement my testimony should I discover additional relevant material.

1 A. No. As I discussed in my Reply Testimony, SBC-Ameritech's witnesses have  
2 made broad claims that the limitations of the Litespan platform preclude offering  
3 CLECs the features, functions and throughput capacity they are requesting. My  
4 review of the Alcatel documents establishes that in fact the reverse is true.  
5 Alcatel's Litespan platform is and has been undergoing constant change. The  
6 decision to make the Litespan NGDLC ADSL-capable is one example of a change  
7 that triggered a continuing series of upgrades and modifications to add features,  
8 functions and capacity.

9 7. Q. PLEASE GIVE SOME EXAMPLES OF THIS CONTINUOUS PROCESS  
10 OF FEATURE AND FUNCTION IMPROVEMENTS.

11 A. The Litespan NGDLC platform's fundamental design supports very flexible  
12 placement of line cards. In fact, Alcatel has designed its NGDLC so that any line  
13 card will fit in any slot.<sup>2</sup> Such design allows the Litespan NGDLC to evolve over  
14 time to support new types of advanced services as new or upgraded types of line  
15 cards become available.

16 Moreover, my review of the Alcatel documents confirms that existing  
17 Litespan NGDLC installations can easily be upgraded to support ADSL-based  
18 services, including line shared ADSL. SBC-Ameritech, of course, refers to this  
19 upgrade as part of Project Pronto. For example, in a cabinet remote terminal  
20 ("RT") installation, this upgrade consists of BEGIN

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1 XX  
2 XX  
3 XX \*\*\* END

4 **CONFIDENTIAL.** If significant ADSL demand is expected, one or more of the  
5 Channel Bank Assemblies may be replaced with a new chassis that includes a fan  
6 assembly mounted just below for heat dissipation.<sup>3</sup> Thus, ILECs need not replace  
7 all of the existing and deployed Litespan infrastructure in order to support ADSL  
8 and line sharing.

9 Moving beyond the flexibility of the basic Litespan architecture, Alcatel's  
10 implementation of ADSL functionality has also been undergoing upgrades and  
11 improvements. For example, the ADLU cards initially available only support two  
12 ADSL ports per card. However, software Release 11 will support four ADSL  
13 ports per ADLU card, and quad ADLU cards are, or will soon be, available.<sup>4</sup>

14 A second example of feature improvement is the availability over time of  
15 additional quality of service ("QoS") ATM classes. Alcatel's initial development  
16 of ADLU cards supported only unspecified bit rate ("UBR"). The current ADLU  
17 cards and systems software also support constant bit rate ("CBR"), and additional  
18 QoS classes are under active consideration for inclusion in future software  
19 releases.

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<sup>2</sup> There are current limitations on the number of ADLU cards that can be placed in the NGDLC, but such limitation is due to heat dissipation, and not to signaling or service issues.

<sup>3</sup> If the ILEC wants to carry the ATM traffic over separate fibers, additional fibers between the RT and the central office will need to be activated as well.

1 A third example of feature improvements concerns the number of  
2 permanent virtual paths ("PVPs") that each Channel Bank Assembly can support.  
3 With Software Release 10.2 and below, only one PVP per CBA is supported.  
4 However, Alcatel has long planned to address this feature deficiency. As early as

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8 <sup>5</sup>**\*\*\*END CONFIDENTIAL.** In an email sent to Chris Boyer and James Keown  
9 on **BEGIN**

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11 **XX.**<sup>6</sup> **\*\*\*END**

12 **CONFIDENTIAL.** This is exactly the kind of feature development I would  
13 expect to occur on a continuing basis, as customers convey to Alcatel their needs  
14 concerning Alcatel's products.

15 In addition to improving the features and functions currently supported by  
16 the Litespan, Alcatel is developing support for additional types of DSL. One  
17 example of this is Alcatel's announcement that Software Release 11 will support  
18 G.Lite, a type of ADSL that can be line shared. In addition, Alcatel has entered  
19 into partnerships with other manufacturers to produce line cards that support

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<sup>4</sup> Alcatel is also developing new Channel Bank Assemblies that will support increase the capacity sixfold for POTS cards (24 ports per card).

<sup>5</sup> Bates A14-000099 (produced by Alcatel). As this email makes clear, SBC was requesting **BEGIN CONFIDENTIAL\*\*\*XX.\*\*\*END CONFIDENTIAL.**

1 HSDL2, and G.SHDSL, and Software Release 11 will support both of these  
2 additional types of DSL.

3 8. Q. DO THE ALCATEL DOCUMENTS YOU REVIEWED INDICATE THAT  
4 THE LITESPAN THROUGHPUT CAPACITY IS EASILY  
5 EXPANDABLE?

6 A. Yes. Alcatel's Litespan Integrated ADSL/G.SHDSL Planning Guide dated April  
7 2001 states

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18 This document, and other Alcatel engineering documents I examined, discuss in  
19 detail the numerous means by which throughput capacity can be expanded on the  
20 Litespan platform. These means include:

- 21 • "un-daisy chain" the ADSL Channel Bank Assemblies. The most  
22 common initial configuration of the Litespan ADSL NGDLC platform  
23 is to "daisy chain" all the ADSL-capable Channel Bank Assemblies  
24 together, to feed a single OC-3c fiber-based signal between the RT and  
25 the central office. This base configuration addresses the reality, as

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<sup>6</sup> Bates A04-000007 (produced by Alcatel).  
<sup>7</sup> A01-000041 (produced by Alcatel).

1 recognized by Alcatel, that initially the individual OC-3c facilities will  
2 be very lightly loaded. As bandwidth demand increases and nears the  
3 capacity of a single OC-3c, removing the daisy chain configuration  
4 vastly increases the throughput capacity. For example, un-daisy  
5 chaining the three ADSL Channel Bank Assemblies in an RT would  
6 triple the throughput capacity for ADSL, from 155 Mbps to 465  
7 Mbps.<sup>8</sup>

- 8 • upgrade from the Litespan 2000 to a Litespan 2012. **BEGIN**

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13 **\*\*\*END CONFIDENTIAL.** Thus, this approach can also triple the  
14 ADSL ATM throughput of the NGDLC.

15 **9. Q. DID YOUR REVIEW OF THE ALCATEL TECHNICAL DOCUMENTS**  
16 **REVEAL ANY MEANS FOR ADDRESSING POSSIBLE CARD SLOT**  
17 **CAPACITY CONSTRAINTS?**

18 A. Yes. As noted above, Alcatel will be making available a quad ADLU card with  
19 four slots for ADSL service. This card, together with Software Release 11, will  
20 double the effective card slot capacity for supporting ADSL services.<sup>9</sup> In

<sup>8</sup> Each Channel Bank Assembly would then need separate fibers running between the NGDLC in the RT and the central office.

<sup>9</sup> Alcatel announced at an industry form with CLECs in Dallas, Texas on July 27, 2000, that it is considering for a future release the support of **BEGIN**



1 addition, the Alcatel documents reveal that ADLU cards can be placed in any of  
2 the line card slots in the Litespan NGDLC. The only constraint on the number of  
3 ADLU cards is heat dissipation, which can be addressed in a number of ways. In  
4 a CEV or hut RT configuration, up to **BEGIN CONFIDENTIAL\*\*\***

5 **\*\*\*END CONFIDENTIAL** Channel Bank Assemblies can be fully equipped  
6 with ADLU cards to support line shared POTS voice and data. In a cabinet RT  
7 configuration, the current three Channel Bank Assembly limit for ADLU cards  
8 can be easily expanded by using a slightly larger **BEGIN CONFIDENTIAL\*\*\***

9 **\*\*\*\*\*END CONFIDENTIAL** cabinet instead of the Litespan 2016  
10 cabinet. The **BEGINCONFIDENTIAL\*\*\*XXXXXXXXXXXXXXXXXXXXXXXXXXXXX**

11 **\*\*\*END CONFIDENTIAL** Channel Bank Assemblies to be populated with  
12 ADLU cards thereby increasing the ADLU card capacity by **BEGIN**

13 **CONFIDENTIAL\*\*\*XXXXXXXXXX. \*\*\*END CONFIDENTIAL** The Alcatel  
14 documents I reviewed indicated that the **BEGIN**

15 **CONFIDENTIAL\*\*\*XXXXXXXXXXXXX \*\*\*END CONFIDENTIAL** is

16 approved by Alcatel as a Litespan enclosure, and has been slated for deployment  
17 in SBC's service territory.<sup>10</sup>

18 10. Q. DO THE ALCATEL ENGINEERING DOCUMENTS YOU REVIEWED  
19 CHARACTERIZE THE LITESPAN 2000/2012 DEPLOYMENTS AS AN  
20 "OVERLAY"?

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**XXXXXXXXXXXXX \*\*\*END CONFIDENTIAL. A04-000623.**

<sup>10</sup> A01-000037, 000055; Documents produced in response to Data Request 7-19 (internal table)

1 A. No. In fact, Alcatel goes to great lengths to emphasize how easy it is to upgrade  
2 existing, already deployed Litespan 200/2012 NGDLC to be ADSL capable.  
3 Thus, in many cases, few or no changes in the outside loop plant are required to  
4 support ADSL capabilities. Moreover, Alcatel's statements indicate that Alcatel  
5 views the Litespan as the platform of the future for all services. In one document,  
6 Alcatel states:

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17 <sup>11</sup> **\*\*\*END CONFIDENTIAL**

18 **11. Q. DID ANY OF THE ALCATEL DOCUMENTS YOU REVIEWED**  
19 **RECOMMEND DEPLOYING NEW LITESPAN NGDLCs IN AN**  
20 **OVERLAY CONFIGURATION?**

21 A. No. In all the Alcatel documents I reviewed, I did not see any instance in which  
22 Alcatel recommends deploying new Litespan-equipped RTs while leaving all  
23 existing copper feeder plant in place and in service. Instead, the Alcatel  
24 documentation routinely describes the Litespan platform as an integrated single  
25 serving platform for all services.

26 **12. Q. DID YOUR REVIEW OF THE ALCATEL DOCUMENTS INDICATE**  
27 **THAT ALCATEL'S POLICY OR PRACTICE IS TO BE THE SOLE**  
28 **MANUFACTURER OF LINE CARDS FOR ITS LITESPAN NGDLC?**

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<sup>11</sup> A08-000046 (produced by Alcatel).

1 A. No. As I stated in my Reply testimony, Alcatel announced in late June that it has  
2 licensed the manufacture of HDSL2 line cards to ADC and Adtran. The Alcatel  
3 documents included the Technology Licensing Agreements between Alcatel and  
4 both of those manufacturers. In fact, there actually are **BEGIN**  
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8 **\*\*\*END CONFIDENTIAL.**<sup>12</sup> Alcatel also produced other Technology License  
9 Agreements, including **BEGIN CONFIDENTIAL \*\*\***

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14 <sup>13</sup>**\*\*\*END CONFIDENTIAL.**

15 I expect this trend to continue, especially given Alcatel's recently  
16 announced intentions to divest itself of virtually all of its own manufacturing  
17 facilities, and instead to outsource manufacturing functions via licensing  
18 agreements with other manufacturers. Let me make clear that it is these Alcatel  
19 manufactured or licensed line cards that Rhythms is seeking to have the ability to

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<sup>12</sup> Bates A03-000176 to 000213; Bates A03-000214 to 000255 respectively (produced by Alcatel). Alcatel also produced the Technology License Agreement with ADC allowing manufacture of HDSL2 line cards. Bates A03-000136 to 000175.

<sup>13</sup> Bates A03-000102 to 000135.

1 place in SBC-Ameritech's Project Pronto NGDLCs. We do not propose the use  
2 of unlicensed line cards from third party manufacturers.

3 **III. SBC-AMERITECH'S TECHNOLOGY DEPLOYMENT CHOICES FAIL TO**  
4 **TAKE ADVANTAGE OF THE FULL CAPABILITIES OF THE ALCATEL**  
5 **LITESPAN PLATFORM, AND DO NOT ENABLE EFFICIENT ACCESS TO**  
6 **NETWORK ELEMENTS BY COMPETITORS**  
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8 13. Q. DO YOU BELIEVE SBC'S TESTIMONY CLAIMING SEVERE  
9 LIMITATIONS IN FEATURES, FUNCTIONS AND CAPACITIES OF  
10 THE LITESPAN 2000/2012 IS SUPPORTED BY THE DOCUMENTS YOU  
11 REVIEWED?

12 A. No. SBC presents a very misleading picture of the current and planned  
13 capabilities of the Alcatel Litespan platform. There are two primary reasons for  
14 this. First, SBC-Ameritech is presenting a very narrow snapshot in time of the  
15 initial configuration it plans to deploy as part of Project Pronto. As the Alcatel  
16 documents indicate, and as good engineering practice demands, SBC-Ameritech  
17 should make an *initial* deployment that is sized to meet the first increment of  
18 demand for services supported by that platform, and then should grow that  
19 installation in the manner described and supported by Alcatel,. as demand for  
20 throughput and features increases. Thus, the proper view is really more like a  
21 movie than a snapshot. Second, SBC focuses only on the subset of Litespan  
22 features, functions and capabilities that it has chosen for its initial deployment to  
23 support its own retail plans implemented through AADS.

24 14. Q. PLEASE EXPLAIN FURTHER.

1           A.     As I discussed above, the Alcatel engineering documents present a clear and  
2                 easily understood growth path for the Litespan platform. I will not repeat each of  
3                 the components of that growth path here. However, I am sure that SBC-  
4                 Ameritech is well aware of each of those components. Taken together, the  
5                 Alcatel Litespan growth path, as discussed in the Alcatel documents,  
6                 demonstrates conclusively what every outside plant engineer has known for years:  
7                 fiber based serving technology really has no practical capacity limits on  
8                 throughput. Thus, using the proper "movie" perspective, I would expect SBC-  
9                 Ameritech to deploy Project Pronto initially just as it has, and then to grow  
10                throughput capacity, features and functions using the means supported by Alcatel  
11                and discussed above. Moreover, I would expect SBC-Ameritech to take  
12                advantage of new features and functions as they become available from Alcatel,  
13                including the quad ADLU card, high capacity POTS Channel Bank Assemblies,  
14                multiple PVPs per channel bank, etc.

15                Moreover, at many points where it had to make an engineering decision on  
16                its Project Pronto deployment, SBC-Ameritech has chosen the option that makes  
17                it difficult to expand the Litespan platform as growth occurs, and makes it  
18                difficult for a competitive carrier like Rhythms to obtain efficient access to the  
19                Litespan platform and the Project Pronto network elements. Here are three  
20                examples of what I mean.

- 21                •     Lucent 82G cabinet. The majority of new Project Pronto RT enclosures  
22                in Illinois and throughout SBC's 13 state region, are cabinets, rather than

1 CEVs or huts. Deploying cabinets may well be the best engineering  
2 choice for new RT installations. However, SBC-Ameritech has chosen a  
3 cabinet size that both restricts the number of ADSL ports that can be  
4 supported, and has no room for the placement of additional equipment.  
5 The Litespan 2016 cabinet being deployed by SBC as its primary new  
6 cabinet enclosure is currently restricted to ADLU cards in three of the  
7 nine Channel Bank Assemblies. However, **BEGIN**  
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- 12 • Absence of cross connect field at the RT. SBC-Ameritech has chosen to  
13 deploy new Litespan RTs with the copper feeder cable pairs spliced  
14 directly onto the protector stubs that feed the NGDLC card slots,  
15 effectively hard wiring all of the feeder pairs into the NGDLC. From an  
16 engineering standpoint, this arrangement is neither required, nor optimal,  
17 especially given SBC-Ameritech's obligations to unbundled its network  
18 at technically feasible points such as at the RT. A much more practical  
19 solution, both for new and existing RT installations, would be to  
20 terminate (depending on expected demand) 25 to 100 feeder pairs per  
21 SAI on the field side of a small cross connect field located at the RT.  
22 Even assuming 100 feeder pairs per SAI (and an average of four SAIs

1 per RT), this cross connect field would be a small and easily locatable  
2 1x1 400 pair facility. The line card slots that support ADLU cards could  
3 then be wired to the office-side binder posts on this cross connect field,  
4 which would allow easy and straightforward cross connection of any  
5 ADLU card to any copper loop served from that RT. In fact, my review  
6 of the documents supplied by SBC-Ameritech from the Kansas line  
7 sharing case show **BEGIN CONFIDENTIAL\*\*\***

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- 17 • Limited QoS options. SBC-Ameritech initially offered only the UBR  
18 ATM QoS class of service to CLECs in its initial deployment of Project  
19 Pronto, despite the fact that the Litespan platform supports both UBR  
20 and CBR permanent virtual circuits ("PVCs"). **BEGIN**  
21 **CONFIDENTIAL\*\*\***

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15. Q. DOES YOUR REVIEW OF THE SBC DOCUMENTS PROVIDED FROM  
KANSAS INDICATE THAT SBC HAS TAKEN A CONSISTENT  
POSITION CONCERNING THE ISSUE OF WHETHER IT IS  
TECHNICALLY FEASIBLE TO OFFER PROJECT PROJECT AS UNES?

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A. No. First, let me make clear that the documents supplied by SBC in Kansas that

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address this issue are SBC-wide documents. Therefore, any information in them

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is fully applicable to Illinois. The documents that I have reviewed show clearly

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that for a significant period of time after SBC announced to its investors its

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deployment of Project Pronto, the SBC internal workgroups charged with

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deploying Project Pronto **BEGIN CONFIDENTIAL\*\*\***

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**\*\*\*END CONFIDENTIAL.** These documents show, and I agree, that it is technically

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feasible to unbundle Project Pronto and offer loop and subloop UNEs on that

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architecture.



1 16. Q. DOES YOUR REVIEW OF THE SBC DOCUMENTS PROVIDED FROM  
2 KANSAS INDICATE THAT SBC HAS TAKEN A CONSISTENT  
3 POSITION CONCERNING THE ISSUE OF OWNERSHIP OF NGDLC  
4 LINE CARDS?

5 A. No. SBC has not taken a consistent position on this issue. The documents that I  
6 have reviewed show clearly that for a significant period of time after SBC  
7 announced to its investors its deployment of Project Pronto, the SBC internal  
8 workgroups charged with deploying Project Pronto **BEGIN CONFIDENTIAL**  
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15 \*\*\*END CONFIDENTIAL.<sup>14</sup>

16 17. Q. DOES YOUR REVIEW OF THE ALCATEL AND SBC KANSAS  
17 DOCUMENTS RELIEVE RHYTHMS' CONCERN ABOUT THE  
18 POTENTIAL FOR HARMFUL INTERFERENCE FROM PLACING  
19 HIGH POWER ADLU CARDS AT THE RT?

20 A. No. As I indicated in my Reply testimony, there is a significant risk of  
21 throughput degradation for DSL services on all-copper loops after Project Pronto  
22 is deployed, because the generation of a strong DSL signal in the field at the RT  
23 can create significant levels of cross-talk. After I filed that testimony, SBC-  
24 Ameritech supplied a document titled "Additional Noise Margin Ratio," which

1 SBC claims addresses and resolves this issue. Rhythms does not agree with this  
2 assertion. As is shown in the attached contribution to the T1E1.4 working group  
3 of ANSI Committee T-1,(attached to my supplemental testimony as exhibit  
4 DW-4) ADSL deployed in remote terminals is not spectrally compatible with  
5 existing home run copper based ADSL services. SBC-Ameritech's  
6 implementation of the additional noise margin ratio approach will not resolve the  
7 problems identified in Exhibit DW-4. Moreover, in the brief time I had available  
8 to examine the current Litespan Standard Practices Manual, I could find no  
9 evidence that Alcatel agrees with SBC that the additional noise margin ratio  
10 approach applied to the Litespan platform would resolve the cross talk problems  
11 shown in Exhibit DW-4.

12 18. Q. DOES THIS CONCLUDE YOUR TESTIMONY AT THIS TIME?

13 A. Yes. However, I reserve the right to supplement my testimony should relevant  
14 information become available.

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<sup>14</sup> Kansas Bates COVAD 001-pg. 1951, 1953-54.

**COMMITTEE T1 – TELECOMMUNICATIONS**

**T1E1.4/2000-302**

**Working Group T1E1.4**

**Savannah, GA, November 13-17, 2000**

**CONTRIBUTION**

**TITLE:** Performance of CO Deployed ADSL due to Crosstalk from RT Deployed ADSL  
**SOURCE:** Copper Mountain Networks, Rhythms  
**PROJECT:** Spectrum Management

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**ABSTRACT**

This contribution examines the impact of crosstalk from remote terminal (RT) based ADSL on central office (CO) based ADSL. It is shown that crosstalk from a remote deployed ADSL is not spectrally compatible with the CO deployed ADSL basis system in the same serving area.

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**NOTICE**

This contribution has been prepared to assist Accredited Standards Committee T1–Telecommunications. This document is offered to the Committee as a basis for discussion and is not a binding proposal on the source companies. The requirements are subject to change in form and numerical value after more study. The source companies specifically reserve the right to add to, amend, or withdraw the statements contained herein.

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## 1. Assumptions

The disturbance source assumptions in Annex L of the draft spectrum management standard (T1 LB869) were used for simulation. The disturbance in to the basis system's downstream receiver includes the following:

- FEXT from the CO based disturbing reference system, coupling length =  $Z$ ,
- NEXT from the CO based disturbing reference system,
- FEXT from the RT based disturbing system, coupling length =  $Z-Y$ ,
- NEXT from the RT based disturbing system, and
- white noise at  $-140$  dBm/Hz

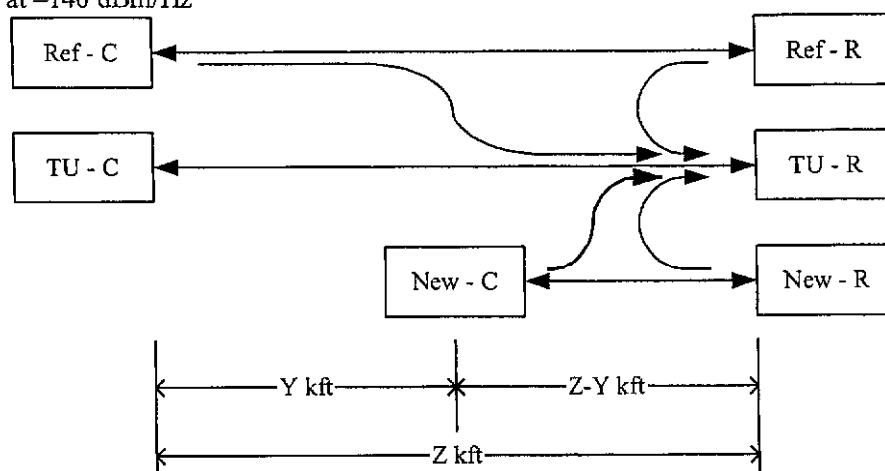


Figure 1 - Basis System Downstream Receiver: NEXT/FEXT with Intermediate TU-C Device

The disturbance in to the basis system's upstream receiver includes the following:

- FEXT from the CO based disturbing reference system, coupling length =  $Z$ ,
- NEXT from the CO based disturbing reference system,
- FEXT from the RT based disturbing system, coupling length =  $Z-Y$ , attenuated by  $Y$
- NEXT from the RT based disturbing system, attenuated by  $Y$
- white noise at  $-140$  dBm/Hz

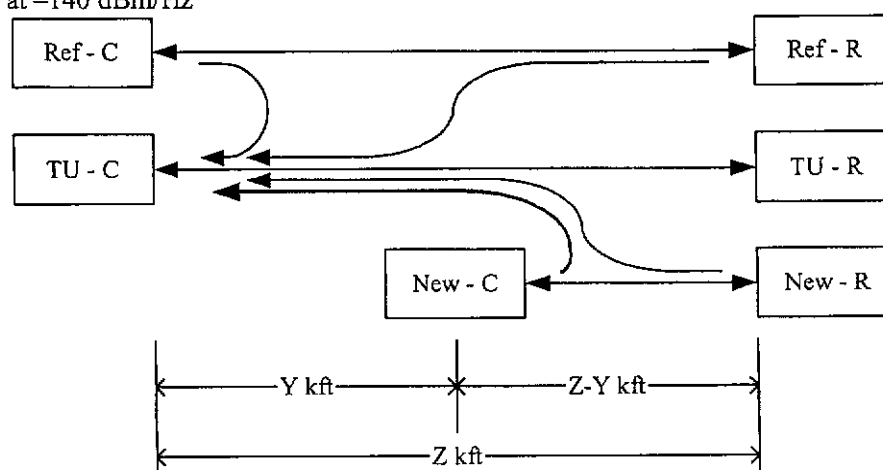


Figure 2 - Basis System Upstream Receiver: NEXT/FEXT with Intermediate TU-C Device

It is obvious that upstream basis system performance due to crosstalk noise from RT deployed ADSL is not as severe as CO based disturbers and is not included in this contribution.

## 2. Simulations

The parameters of the simulation are defined in Annex A of the draft spectrum management standard, T1 LB869. Simulation model of compatibility with ADSL (section A.8) was used in simulation. Spectral compatibility as determined by the draft spectrum management standard, T1 LB869 is defined as a new technology causing more disturbance to a basis system then the reference disturber.

All three ADSL performance levels were analyzed. The performance level evaluation loop Z is not reduced to obtain spectral compatibility with the ADSL basis system because the source of the disturbance is FEXT. With a FEXT based disturbance, the only variables used to meet spectral compatibility requirements are the disturbing technologies distance (Y) from the CO and the disturbing technologies PSD. Because of simulation uncertainty for lengths less than 1000 ft, the data is only show for NEXT/FEXT if the coupling length is 1 kft or greater.

The length Z was fixed at the evaluation loop length for the ADSL basis system. The length Y from the CO to the RT was varied and the PSD of the remote deployed ADSL was from T1.413-1998 Annex F with a 3.5 dB reduction. Three simulations for the ADSL basis system were run: Z=9kft with target data rate of 4850kbps, Z=11.5kft with target data rate of 3095kbps, and Z=15.5kft with target data rate of 425kbps. In each of the three simulations, two crosstalk scenarios were considered: 24 RT ADSL NEXT/FEXT and 12 RT ADSL NEXT/FEXT + 12 Reference NEXT/FEXT. The results are shown in Figures 3 – 5.

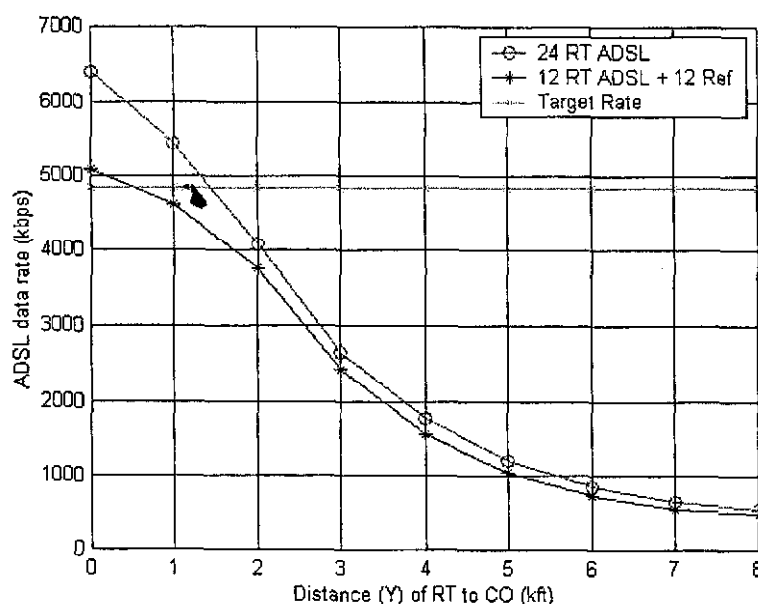


Figure 3 –ADSL downstream basis system performance level A (Z = 9 kft)

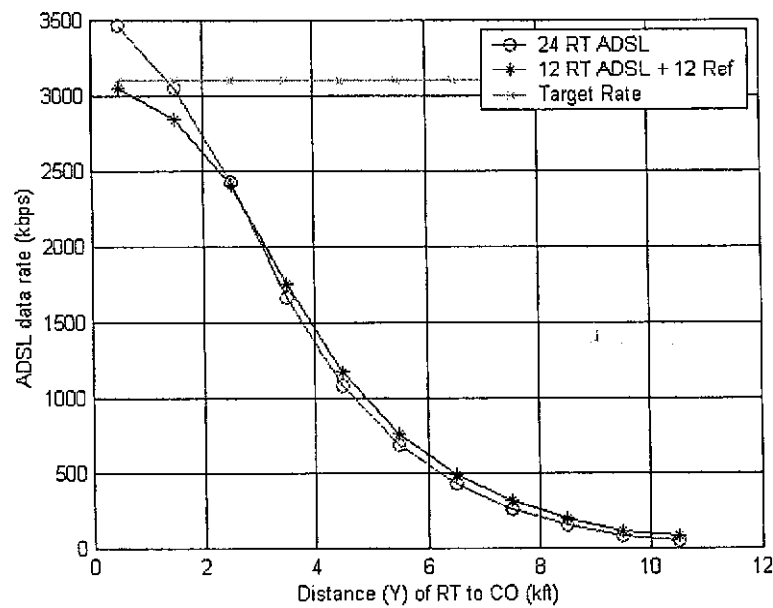


Figure 4 – ADSL downstream basis system performance level B ( $Z = 11.5$  kft)

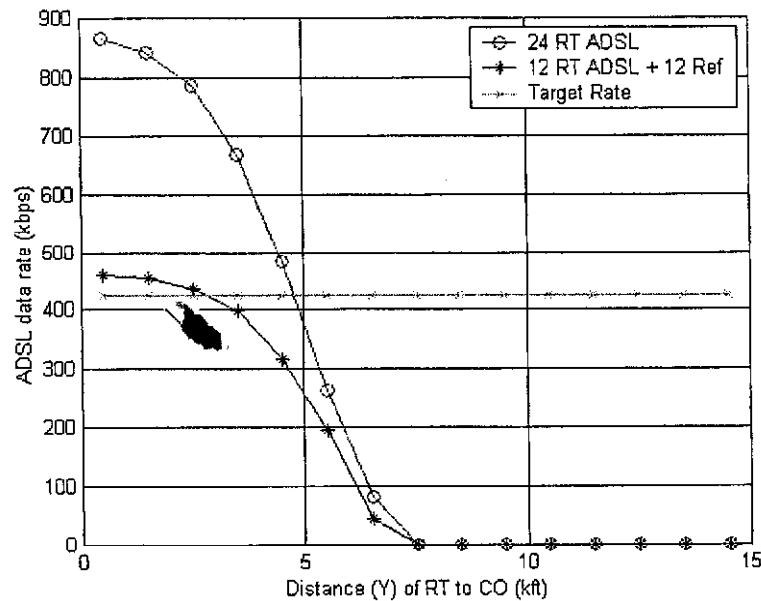


Figure 5 – ADSL downstream basis system performance level C ( $Z = 15.5$  kft)

### 3. Conclusion

This contribution has shown that remote deployed ADSL is not spectrally compatible with the basis systems when a CO and RT provide ADSL service to the same service area. The remote deployed ADSL is more catastrophic to downstream performance of CO deployed ADSL than repeated HDSL and T1 AMI<sup>1</sup>. The standard needs to recognize that remote ADSL deployments are not spectrally compatible with the basis systems in the same service area.

<sup>1</sup> Draft spectrum management standard, T1 LB869, Table G.1